

## ABSTRACT

An object of the present invention is to provide a multiplexer/demultiplexer capable of preventing a decrease in multiplexing/demultiplexing efficiency due to an error in wavelength or due to a crosstalk with other wavelengths. A two-dimensional photonic crystal having holes 22 cyclically arranged is provided with an input waveguide 23 and an output waveguide 24. Located between the two waveguides are two point-like defects 25 and 26, each consisting of a region devoid of the holes 22. From the light including various wavelengths and propagating through the input waveguide 23, the two point-like defects extract a ray of light having a wavelength determined by the shape of the point-like defects and introduce it into the output waveguide 24. Compared with the case where there is only one point-like defect, the above-described construction increases the values of the wavelength spectrum of the extracted light at around the resonance wavelength and decreases the values at the wavelength range far from the resonance wavelength. Therefore, the increase in the values of the wavelength spectrum at around the resonance wavelength ensures that the light having the desired wavelength can be extracted from the waveguide by a large amount even if the wavelength of the light propagating through the waveguide is erroneously shifted from the resonance frequency. Occurrence of noises within a wavelength range far from the resonance wavelength and extraction of light having the wavelengths of adjacent channels are also suppressed.